LIPA
Long Island Power Authority

More choice...
Better service!

Modernizing the Northeast Grid Strategies Efforts and Regional Issues

Modern Grid Initiative

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The Need for New Technology: A Case for Intelligent Grid Technology

- The National Electric Grid is Vital to the Success of the Economy
- Economic Perspective
  - $100 to $160 Billion per year due to outages
  - $24 billion per year due to PQ
  - Need to improve to help U.S. business compete
- Utility Investment Perspective
  - Demands from our customers Re: SQRA are rapidly increasing
  - Cost pressures, market restructuring and new technology are rapidly causing changes in the way we do business
  - Significant costs / investment recovery requirements necessitable strategic planning and technology deployment

The Importance of Manufacturing / High Technology to Long Island

- Employment / Cost of Living
  - Average 4% unemployment but 15,000 jobs added primarily service sector
  - Average wage of $43K only 10% higher than National Average
  - Average cost of housing $450K, with Property taxes averaging $10K
- Manufacturing
  - Today less than 10% of total 1.24 million jobs
  - Stabilizing
  - Creates new high value added jobs and can stimulate new technology and new industries
- Manufacturing / Technology Opportunities
  - Defense
  - Homeland Security
  - Medical Manufacturing
- Long Island's Economy is Robust; if compared to a state it would be about 15th of 50 states in size. Yet we must think of the future, and the role we play in the economy.

Question: Is Long Island any different than any other of the US?

Improving Manufacturing Competitiveness

- Automating The Manufacturing Process
- Worker Skill Set Training
- Energy Effectiveness
  - Utilization
  - Ensure the reliability of the critical infrastructure

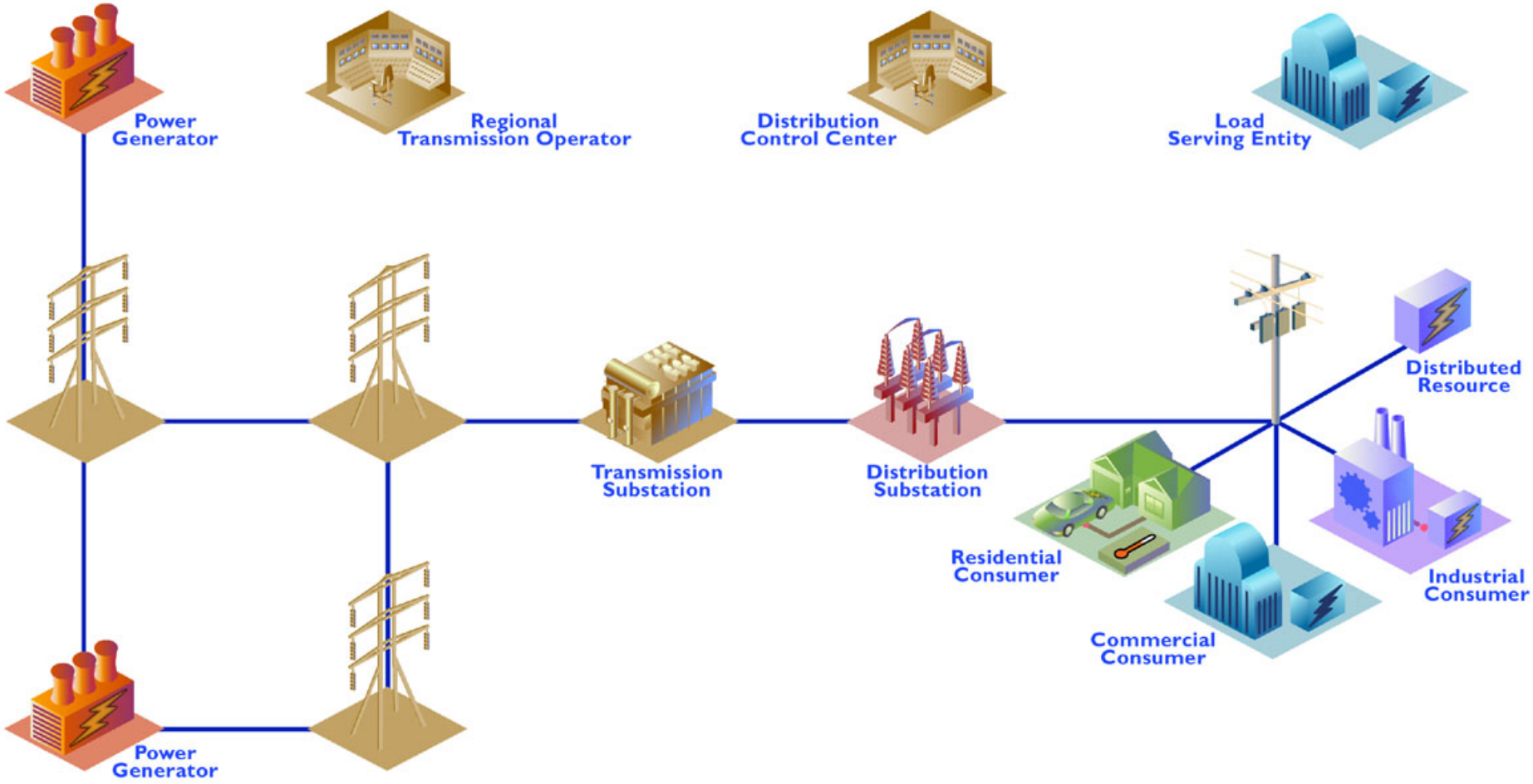
Manufacturing in America: A Comprehensive Strategy to Address the Challenges to U.S. Manufacturing

US Department of Commerce – January 2004

Today's Power Delivery System Needs Modernization

- Investment needed to date is immense - $400 Billion in book value
- Current System
  - Antiquated Design
  - 1950's Technology
  - 21st Century End – Users
- Needs Modernization
  - Reliability / Security
  - Control
  - Advanced customer services
- LIPA'S System is Representative of the general state of the Industry

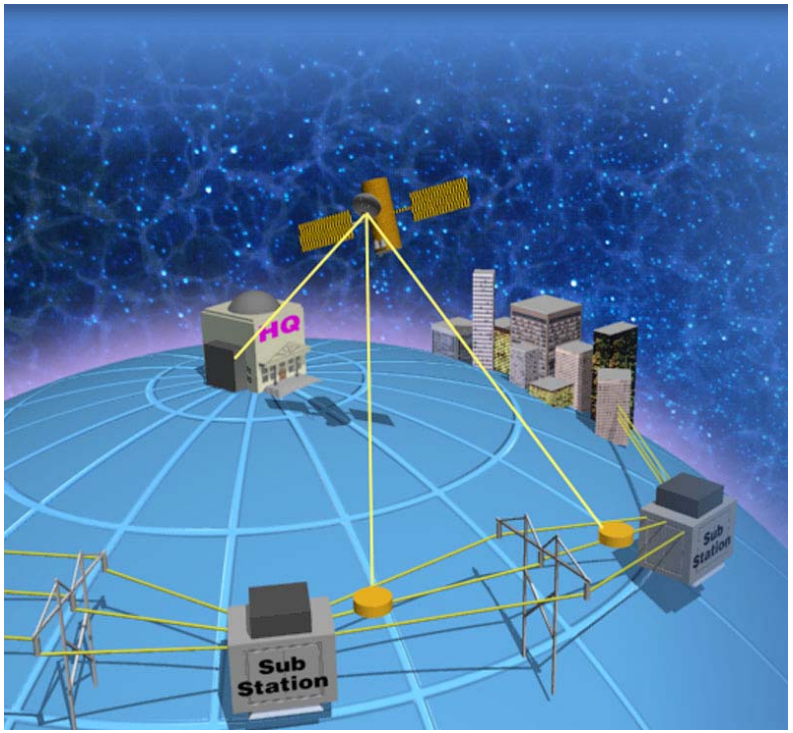
Today's Electric Infrastructure



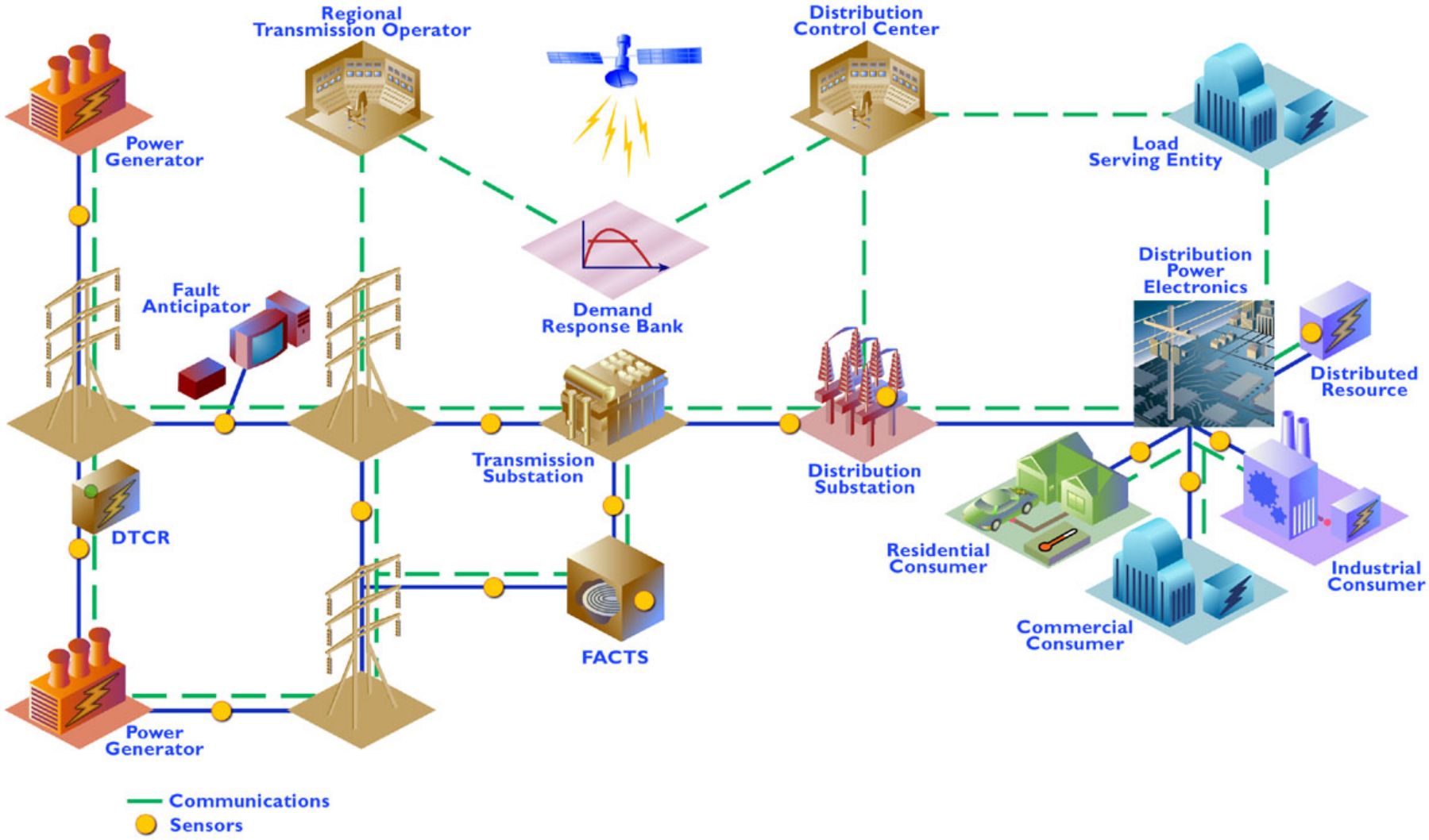
The Power Delivery System of the Future – The "Intelligent Grid"

Makes use of communications, computing, sensing & power electronics technologies to create a system that is:

- *Self-Healing* and *Adaptive*
- *Interactive* with consumers and markets
- *Optimized* to make best use of resources and equipment
- *Predictive* rather than reactive, to prevent emergencies
- *Distributed* across geographical and organizational boundaries
- *Integrated*, merging monitoring, control, protection, maintenance, EMS, DMS, marketing, and IT
- *More Secure* from attack



The Electric Infrastructure for a Self-Healing Grid



Attributes and Benefits: The Intelligent Grid

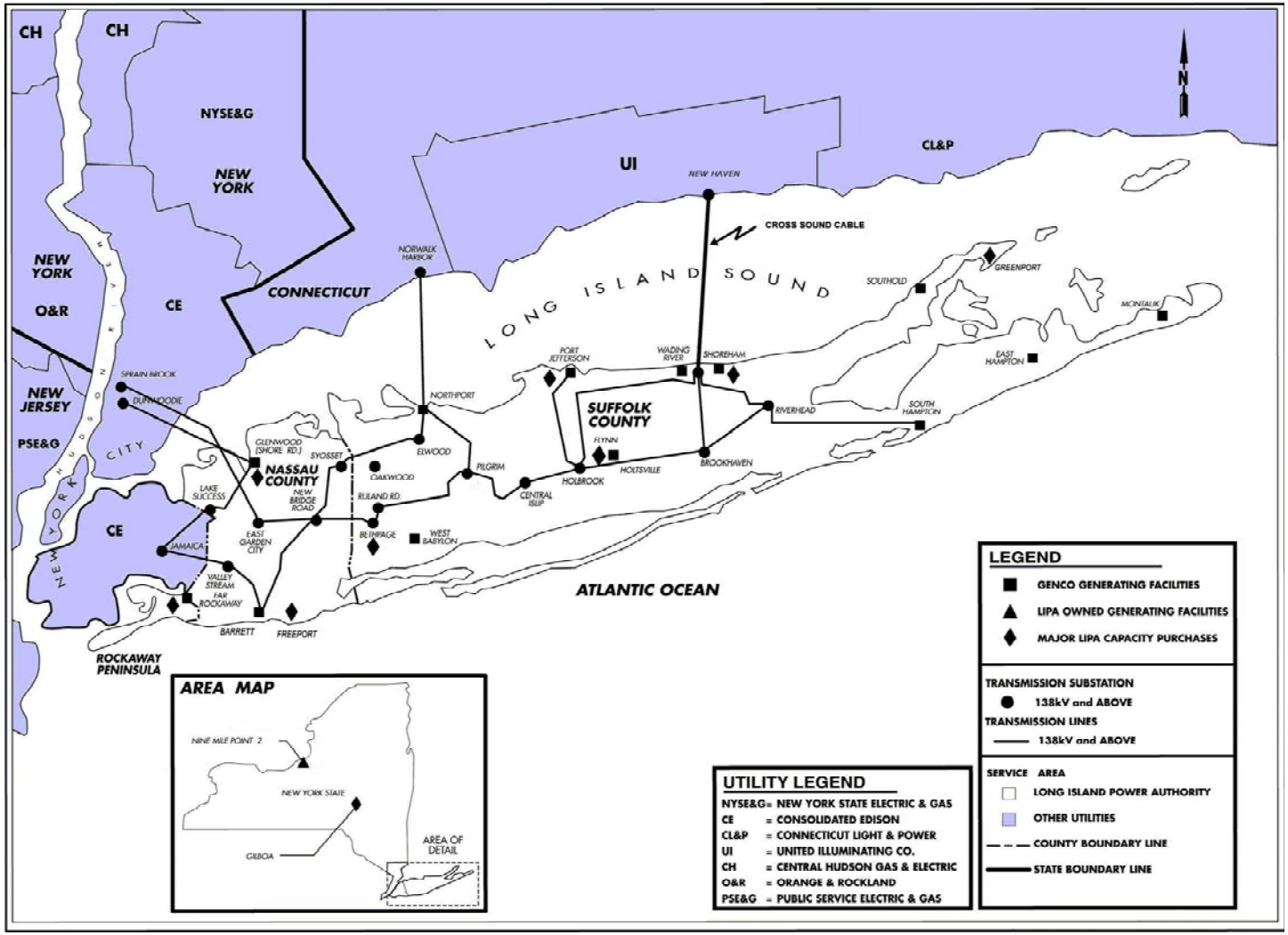
Power Delivery (Improvements/ Benefits) 	**Attributes**	**Consumer Portal (Improvements/ Benefits)** 
O&M Cost Capital Cost of Asset T&D Losses	***Cost of Energy (Net delivered life-cycle cost of energy service)***	End Use Energy Efficiency Capital cost, end user infrastructure O&M, End User Infrastructure Control/Manage Use
Increased Power Flow New Infrastructure Demand Responsive Load	***Capacity***	Improved power factor. Lower End User Infrastructure cost through economies of scale and system streamlining, expand opportunity for growth
Enhanced Security Self Healing Grid for Quick Recovery	***Security***	Enhanced Security and ability to continue conducting business and every day functions
Improve Power Quality and enhance equipment operating window	***Quality***	Improve Power Quality and enhance equipment operating window
Reduce frequency and duration of outages	***Reliability***	Enhanced Security Self Healing Grid for Quick Recovery
Reduced EMF Reduction in SF6 (sulfur hexafluoride) emissions Reduction in cleanup costs Reduction in power plant emissions	***Environment***	Improved Esthetic Value Reduced EMF Industrial Ecology
Safer work environment for utility employees	***Safety***	Safer work environment for end-use electrical facilities
Value added electric related services	***Quality of Life***	Comfort Convenience
Increase productivity due to efficient operation of the power delivery infastrucuture Real GDP	***Productivity***	Improved consumer productivity Real GDP

LIPA'S Efforts in Grid Modernization

About the Long Island Power Authority

- Established In May of 1998
- Long Island's primary electric service provider
- The third largest public power utility in the nation in terms of customers served
- More than 1.1 million customers – 20,000 GWH in Annual Sales
- System of 535,000 utility poles, 8,866 miles of overhead wire, and almost 5,000 miles of underground cable.
- As an Island limited off- island supply
- System automation limited to the "Average" customer (yet more than 1300 ATO's /ASU's deployed on our system)

LIPA's Service Area



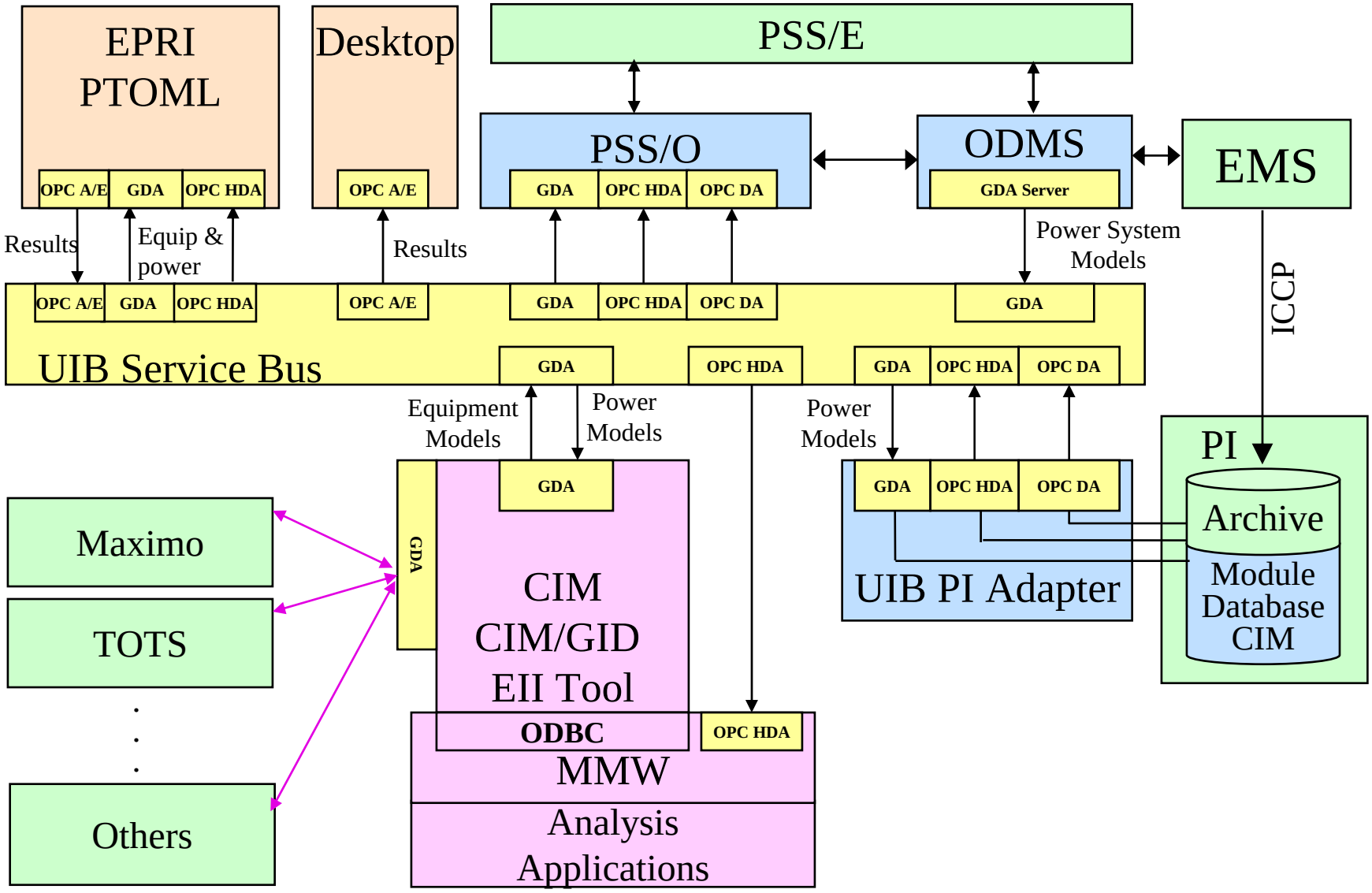
LIPA's Current Strategy for Grid Modernization

- Collaboration
  - Industry vision for the Modern Grid: IntelliGrid
  - Customer Vision for what a Modern Grid should provide: Advanced Manufacturing Demonstration

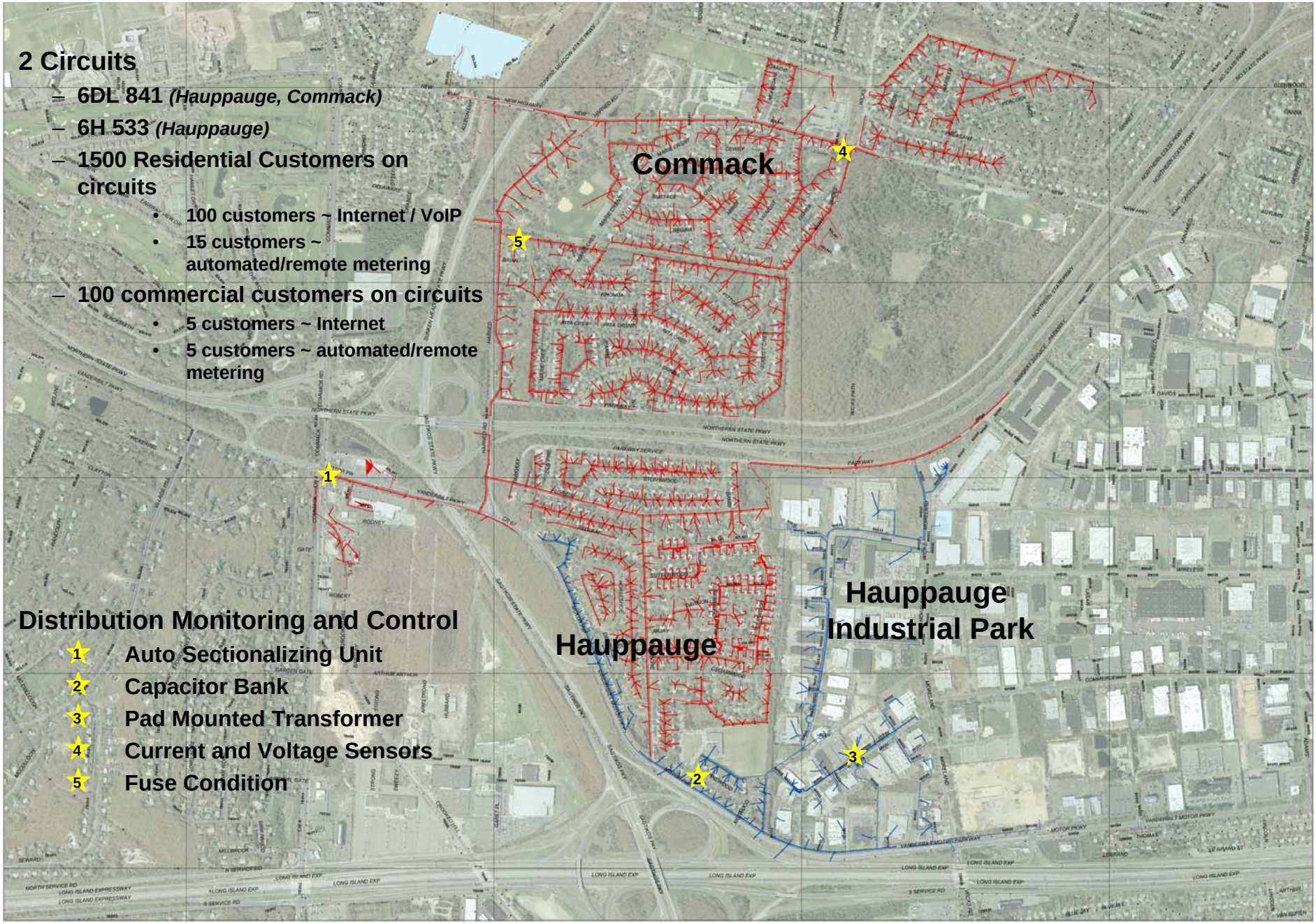
- Strategic Opportunities for Modern Grid Application
  - Systems Architecture Design and Construction
  - Design and Eventual Construction of a Communications Medium to Support Deployment of Modern Grid Techniques

- Demonstration and Testing
  - Intelligent Grid concepts through BPL Demonstration
  - Superconducting Transmission Cable

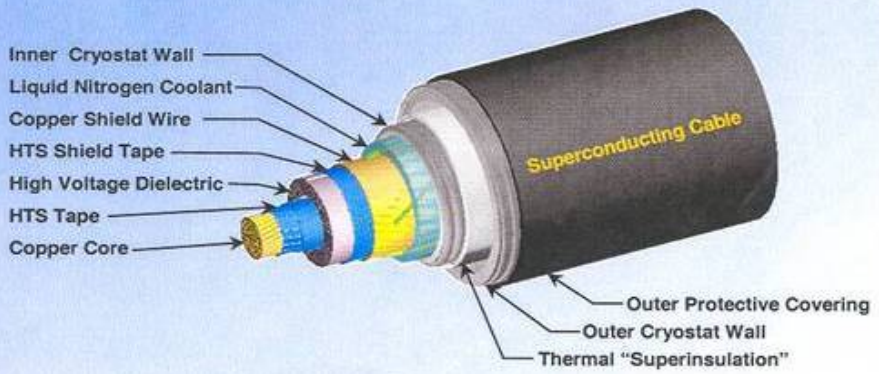
LIPA Systems Architecture Utilizing IntelliGrid



LIPA BPL Demonstration Project



Holbrook Superconducting Transmission Cable

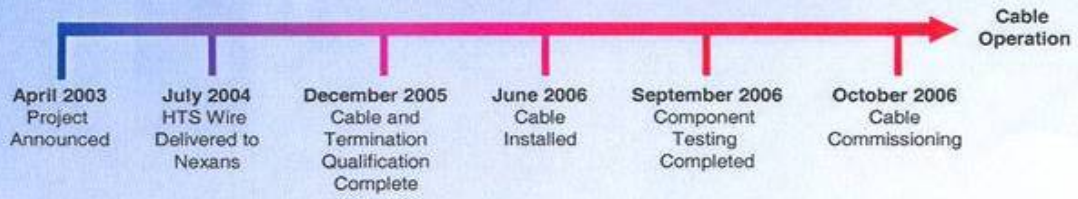


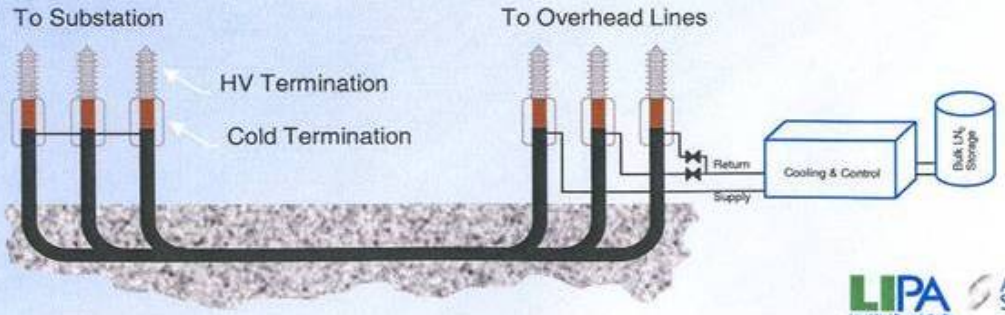
Electrical / Physical Characteristics

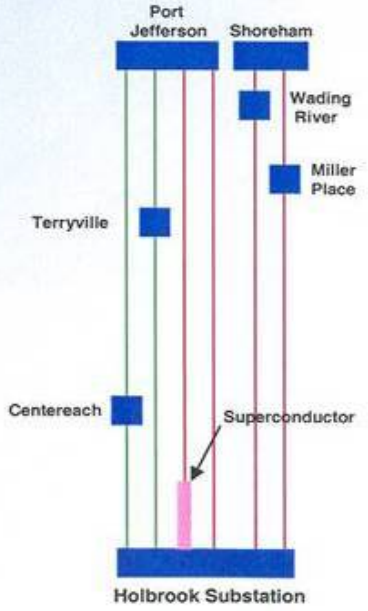
- 600 Meters (~2000 feet)
- 3 separate phases in conduit
- Cold Dielectric Design
- 2 sets of terminations

- 1 refrigeration system
- 6.6 kW; He/LN_2 Cycle

- Design Voltage / Current 138 kV / 2400 A (600 MVA)
- Operating Voltage / Current 138 kV / 920 A (220 MVA)







LIPA American Superconductor Nexans AIR LIQUIDE